

U.S. Patent Application Serial No. 10/822,190

Reply to Office Action of July 25, 2007

REMARKS

Reconsideration of the application is requested in view of the above amendments and the following remarks.

Status Summary

The claims 7 and 10 to 13 were withdrawn in the response to restriction requirement of 29th June 2007. In the Office Action dated 25th July 2007, the Examiner has withdrawn claim 18. Claim 14 is rejected under 35 U.S.C. 112 and claims 1 to 6, 8, 9, 14-17 and 19 to 21 are rejected under 35 U.S.C. 102. Of the claims rejected under 35 U.S.C. 102, claims 1,16,17,19 and 21 are independent claims (the other claims being dependent claims).

Claim amendments

By way of this amendment, claims 19, 20 and 21 are cancelled, without prejudice.

Independent claims 1, 16 and 17 have been amended to distinguish their subject matter more clearly from the prior art. Claim 14 has been amended to address the clarity objection under 35 U.S.C. 112.

Restriction Requirement

Species I (Figures 4 to 6 and 12) was elected previously for further prosecution. In the present Office Action, the Examiner has withdrawn claim 18 "as being of a different species". However, no explanation for this assertion is provided. Applicants request further details from the Examiner concerning which of the species I-IV (as set forth in the Restriction Requirement mailed on May 29, 2007) claim 18 is a part of if it is not part of the elected species (Figures 4-6 and 12). Applicants respectfully submit that claim 18 reads on the elected species.

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Information Disclosure Statement

Certain formal deficiencies in the Information Disclosure Statement dated August 4, 2004 are noted by the Examiner. Applicants note that the Examiner has initialled all references on the form 1449 filed with the August 4, 2004 IDS. Applicants provide an updated form 1449 listing all references from the August 4, 2004 IDS with proper inventor name and dates in the event the Examiner wishes to review and initial this updated version.

Claim rejections under 35 U.S.C. §112

Claim 14 was rejected under 35 U.S.C. 112, second paragraph, as being indefinite because there was insufficient antecedent basis for the limitation “said tube”. In the amended claims filed herewith, claim 14 has been amended to be dependent upon claim 9 in order to address this objection.

Claim rejections under 35 U.S.C. §102

Claims 1 to 6, 8, 9, 14 to 17 and 19 to 21 are rejected under 35 U.S.C. 102 (b) as being anticipated by Inamura et al. (US 5,653,391). Applicants respectfully traverse this rejection.

The Examiner notes the presence of a member 330 in Inamura to induce rotational movement of an extinguishant. The member (or “spiral”) 330 of Inamura is illustrated in Figures 12 and 18, which are reproduced below for ease of reference.

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FIG. 12

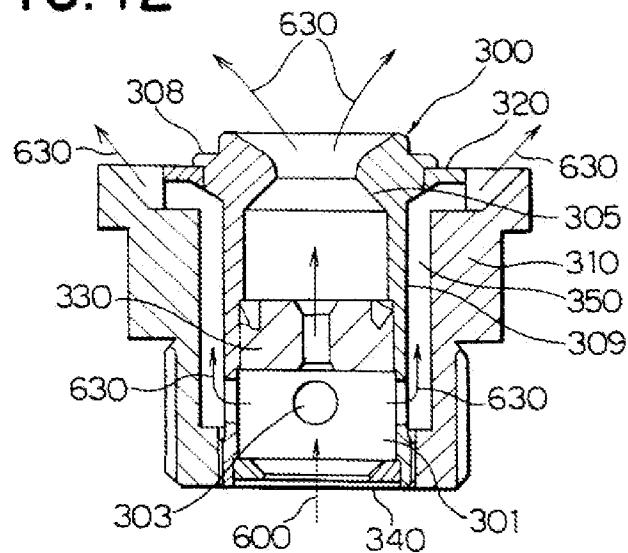
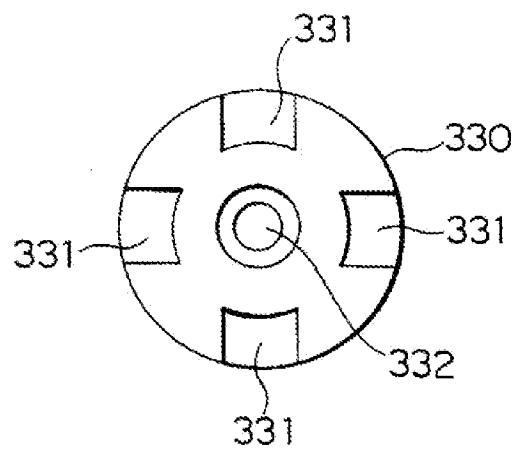


FIG. 18



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The member 330 is described by Inamura on page 5 at lines 20 to 24 as follows:

A spiral 330 and an orifice 340 are positioned in the inner nozzle 301. As shown in Fig. 18, the spiral 330 is provided with grooves 331 formed spirally on the sidewall of the spiral 330, and stirs water for fire-fighting to produce a spiral flow. Reference numeral 332 denotes a water supply hole.

The spiral 330 is also described in column 6 at lines 52 to 56, where it is stated:

After the water 600 for fire-fighting passed through the orifice 340 is formed into a swirl flow by the spiral 330 and then restricted by the reducing section 305, the water 600 is discharged in a circular cone form as the discharged water flow 630 from the inner nozzle 301.

Although it is not clear from Inamura, it seems that the member 330 is a cylindrical member. The cylindrical member 330 appears to have a central passage 332 through which extinguishant passes. The member 330 also has grooves 331 formed “spirally” in its sidewalls, which are said to produce a spiral flow of extinguishant. The member 330 is fitted inside nozzle body 300, which has a wall which defines an interior cavity 309. The outlet 305 is for discharging extinguishant fluid into a fluid-filled volume for extinguishing a fire in that fluid-filled volume. The passage of extinguishant is restricted by the tapering of outlet 305 to produce a conical discharge as indicated by arrows designated 630.

Amended claim 1 requires a nozzle body having a wall defining an interior cavity of a nozzle body. An extinguishant inlet receives extinguishant fluid into the cavity. The extinguishant outlet is formed in the wall that defines the cavity for discharging extinguishing fluid from the cavity into a fluid-filled volume for extinguishing a fire in that fluid-filled volume. The arrangement of the outlet is such that a rotational movement of fluid, including the extinguishant, within the fluid filled volume is induced. This rotational movement tends to distribute the extinguishing fluid homogenously within the fluid-filled volume.

The spiral grooves 331 of Inamura do not correspond to the presently claimed outlet. The spiral grooves 331 of Inamura are not formed in a wall defining an interior cavity of a nozzle

body. The extinguishant discharged from the spiral grooves 331 is discharged into the portion of the interior cavity between the top of the member and the tapered outlet 305. It is the fluid discharged from tapered outlet 305 that is for extinguishing a fire in a fluid-filled volume.

However, the tapered outlet 305, although formed in the wall of the nozzle body, does not correspond to the presently claimed outlet. The present claim 1 specifies that it is the arrangement of the outlet in the wall of the nozzle body that causes rotational movement of the fluid. The tapered outlet 305 of Inamura is a simple hole aligned with the central axis of the interior cavity of the nozzle body. The outlet 305 does not induce any rotational movement. The member 330 within the interior cavity of Inamura might induce some rotational movement (albeit not the type claimed in independent claim 1), but this rotational movement is not provided by an outlet formed in the wall of the nozzle body.

Furthermore, in Inamura there is no disclosure of the arrangement of the outlet being such that a rotational movement of the fluid, including the extinguishant fluid, within a fluid-filled volume is induced which tends to distribute the extinguishant fluid homogenously within the fluid-filled volume for extinguishing a fire in that fluid-filled volume. This is described in the present specification from page 7 at line 26 to page 8 at line 1. This is completely contrary to the teaching of Inamura. The nozzle 300 of Inamura is a “short range nozzle”. The short range nozzle does not affect the discharged water flow 610 from the medium range nozzles 100 and the discharge water flow 620 from the long range nozzle 200 (see column 6 at lines 46 to 51 of Inamura). If the fluid outlet of Inamura worked in the same way as the outlet of the present invention, then the short range nozzle 300 of Inamura would distribute the extinguishant homogenously within the fluid-filled volume (the area to be extinguished), and therefore would affect the discharged water flows from the medium range nozzles and the long range nozzles.

In view of the amendments made to independent claim 1, and the arguments presented above, it is submitted that the subject matter of amended claim 1 is neither anticipated by nor rendered obvious by Inamura.

New independent method claim 24 includes the features of amended independent system claim 1, and is submitted to be patentable for the same reasons as amended independent claim 1.

Amended independent claim 17 claims a chamber containing fluid, such as air, having a fire extinguishing spray nozzle mounted therein for extinguishing a fire in that chamber. The fire extinguishing spray nozzle is defined in amended independent claim 17 to include the features recited in amended independent claim 1. Therefore, it is submitted that independent claim 17 is patentably distinguished from Inamura for the same reasons as amended in independent claim 1.

Independent claim 16 is directed to a fire extinguishing spray nozzle. Independent claim 16 specifies that the spray nozzle has a nozzle body with two end portions located generally opposite to one another and spaced apart by a sidewall. The end portions and the sidewall define a cavity. The outlet for discharging extinguishant fluid from the cavity extends through the sidewall. At least a portion of the outlet is straight and inclined with respect to any plane which is aligned with and passes through the central axis of the cavity and which intersects the portion of the or each outlet.

Amended independent claim 16 is distinguished from Inamura because it specifies that the outlet extends through the sidewall of the cavity and includes a portion that is straight and inclined with respect to any plane which is aligned with and passes through the central axis of the cavity and which intersects the portion of the outlet. In Inamura the tapered outlet 305 of the cavity clearly is not inclined with respect to any plane which is aligned with and passes through the central axis of the cavity and which intersects the portion of the outlet. The spiral grooves 331 of the member 330 of Inamura (if they are to be considered to be the presently claimed “outlet”) do not extend through the sidewall of the cavity and do not include a portion which is

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straight. The arrangement claimed in amended independent claim 16 is therefore neither disclosed nor suggested by Inamura.

Compared to the arrangement of Inamura, the presently claimed arrangement is remarkably simple and can provide reduced manufacturing costs and greater reliability. These advantages indicate the inventiveness of the presently claimed spray nozzle arrangement. Reconsideration is respectfully requested in view of the amendments made to the claims and the remarks herein.

New Claims

New claim 22 is dependent upon claim 2 and recites that a plurality of outlets are provided. Such an arrangement is disclosed, for example, in Figure 5 of the present application.

New claim 23 is dependent upon new claim 22 and specifies that the inclination of all the outlets with respect to any plane which is parallel to and passes through the central axis of the cavity and which intersects a portion of the outlets is in a clockwise direction about the central axis of the cavity or the inclination of all the outlets with respect to such a plane is in an anti-clockwise direction about the central axis of the cavity. Basis for new claim 23 can be found in, for example, Figures 4, 5, 6, 8, 9, 10 and 11 of the present application.

New independent claim 24 is an independent claim directed to a method of extinguishing a fire in a fluid-filled chamber using a nozzle of the type claimed in amended independent claim 1.

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In view of the above amendments and remarks, Applicant respectfully requests a Notice of Allowance. If the Examiner believes a telephone conference would advance the prosecution of this application, the Examiner is invited to telephone the undersigned at the below-listed telephone number.

Respectfully submitted,

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